

# *COTS in Military Systems*

## *A Ten Year Perspective*



Presentation by:  
Mr. Gregory Saunders  
Director  
DSPO

# 1776 – 1781

## Revolutionary War

Even George Washington's Continental Army went to war with civilian clothing, equipment, and weapons. They went to



# *COTS – War of 1812*

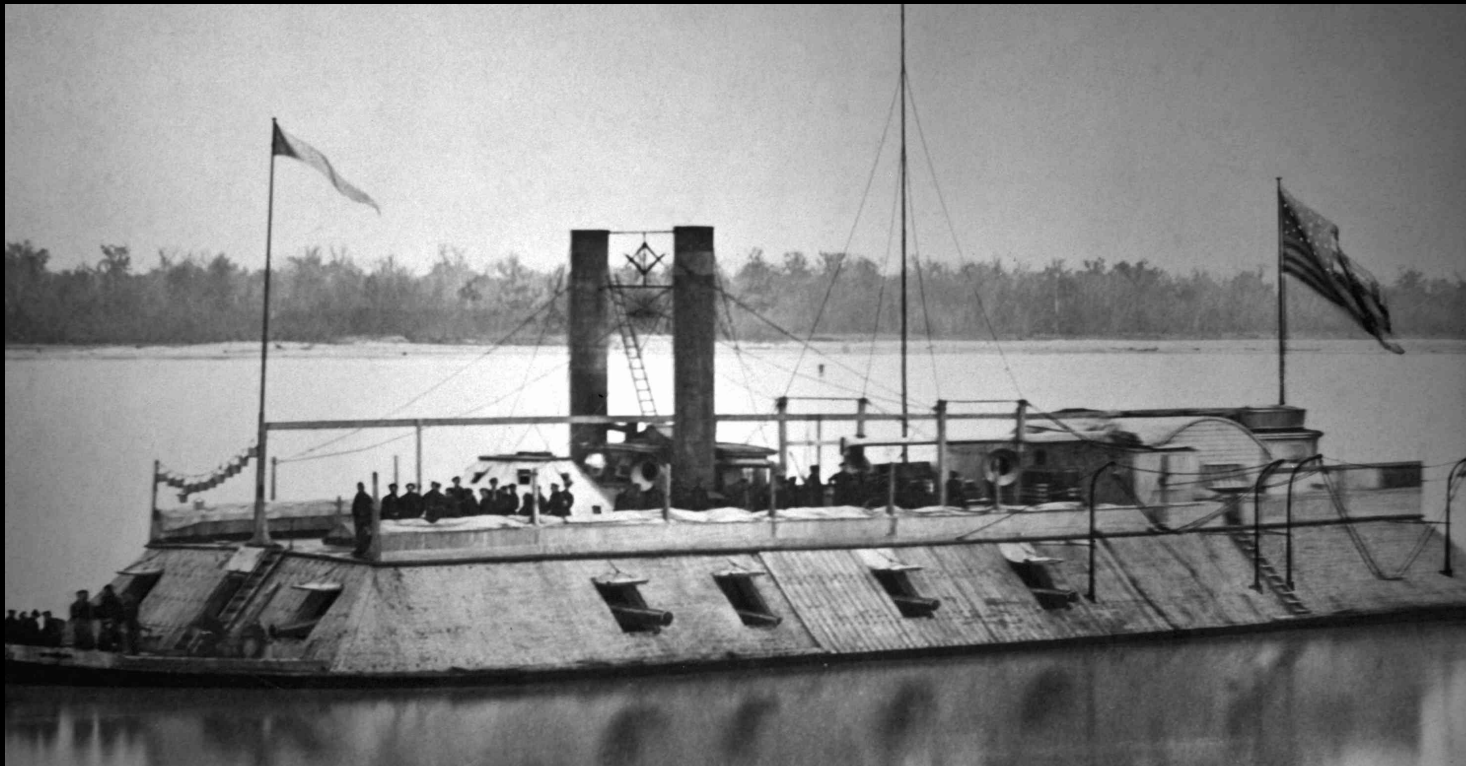
By the war of 1812, we had advanced little on the situation that existed in 1776.





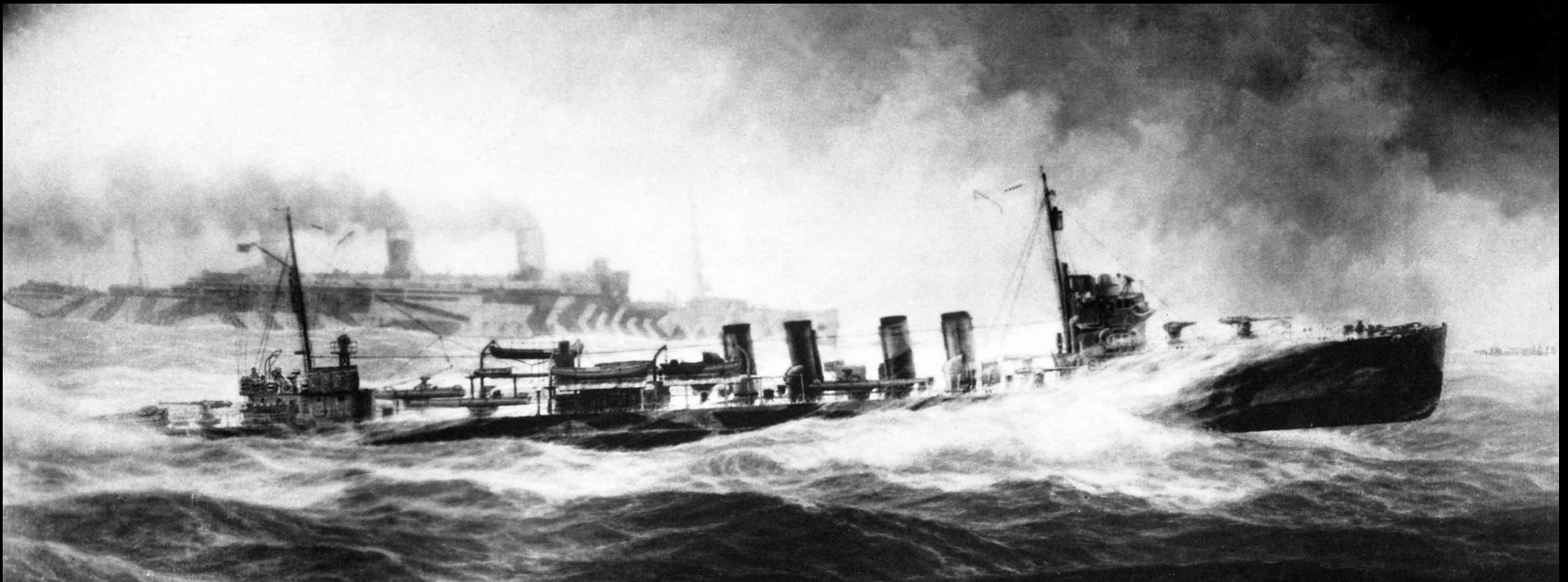
# *COTS – U.S Civil War*

By the U.S. Civil War, military unique equipment was increasingly replacing commercial off-the-shelf items.



# *COTS – World War I*

By World War I, the proliferation of technology-driven standardized military unique equipment was on a roll.



# *COTS – World War II*

- World War II, military unique technology increasingly replaced commercial products across a broad spectrum of requirements.





# *COTS – Korea, Viet Nam, & Gulf War*

MIL Spec components assured quality and performance

BUT

Some COTS products began to outperform Mil Spec products on the battlefield



# *The Movement Back to*

- 1949 – President Truman's Scientific Advisory Board urges greater use of commercial products
- 1972 – Report of the Commission on Government Procurement – Congressional Commission asserts the Government can make much greater use of the commercial marketplace
- 1982 – ADCoP Policy – After several years of pilots, DoD issues first formal policy on commercial acquisition – invents CIDs



# *The Movement Back to*

- 1991 - SecDef Perry, announces the *DoD Strategic Acquisition Initiative* (SAI) - mandates that U.S. defense contractors look first at COTS products when developing new technology and upgrades.
- 1994 - SecDef Perry memorandum “*Specs and Standards – A New Way of Doing Business*” mandates preference for commercial standards and products
- 1997 - SecDef Cohen launches *Defense Acquisition Reform Initiative* accelerated COTS

# *Why COTS?*

- Latest technology
- Shorter development cycle
- Ready availability
- Reduced acquisition cost
- Lower support cost
- Faster technology refresh cycle
- Leverage commercial investment
- Benefit from best commercial practices
- Open system architectures
- More flexible, scalable, and configurable

# *Additional Factors Driving Move to COTS*

## **Microcircuits and Components**

- rapidly evolving technology
- dramatic worldwide market growth
- explosion of commercial use
- shrinking DoD market share
- declining supplier base for "Mil-Spec" components
- need for latest technology to maintain technological lead

# *What is a COTS Product?*

- Sold, leased, or licensed to the general public
- Offered by a vendor trying to profit from it
- Listed for sale with a list price
- May conform to industry standards
- Supported and evolved by the vendor, who retains the intellectual property rights
- Available in multiple, identical copies
- Used without modification of the internals
- Not developed or owned by the Government



# *COTS Challenges*

- COTS may add new complexity to parts management.
- Increased need for technology refresh, insertion, and obsolescence management.
- Some COTS products may not hold up to harsh military environment and use.

# *1994 - 2004*

## *The COTS Revolution*

### *Did We make the Right Decision?*



# *COTS Success Story*

## **Acoustic - Rapid COTS Insertion Program**

- **Replace existing submarine acoustic systems**
  - Installed A-RCI on the first ship less than 2 years after it started the program
  - Completed three major submarine upgrades in the first 3 years
  - Savings of \$3 million per hull over the legacy sonar systems
  - U.S. regained a clear acoustic advantage through improved sonar performance
  - 200 times increase in computing power at one-tenth the cost
  - Reduced scheduled maintenance actions by 56 percent
  - Reduced the training time from 20 weeks to 4 weeks
  - An \$8 million inventory reduction over 4 years

# *COTS Success Stories*

## **NASA - Control Center System (CCS)**

- Ground-based command and control system for the Hubble Space Telescope.
  - Successfully integrated 30 COTS and GOTS components with one million lines of legacy code and one half million lines of custom code.
  - prototype built in three months
  - first production release one year after proof of concept
  - greater productivity than previous systems
  - new and enhanced capabilities



# *COTS Success Stories*



## **Airborne Warning and Control System (AWACS)**

- **Mission Computer Upgrade**
  - COTS operating system software
  - 22 COTS central processing units (CPUs)
  - Higher availability
  - Increased capability
  - Lower cost

# *COTS Success Stories*

## **U-2 Reconnaissance Fleet**

- Radar Computer Upgrade

## **Crusader Field Artillery System**

- Integrated Data Environment (IDE) development

## **CMstat V5**

- Configuration management for F-22, Paladin, Crusader, and DDG-51

## **AN/PPS-5**

- Ground Surveillance Radar Modernization

# *COTS Success Stories*



## **Defense Dissemination System (DDS)**

- **Laser Beam Recorder**

## **Aviation and Missile Research and Development Engineering Center**

- Avenger Training System Upgrade

## **Electronic Miniaturization for Missile Applications Program**

- Standard Missile Electronics Assembly Unit

# *Why COTS is a Success*

- The COTS business model works because the incentives and market pressures compel economically rational decisions, resulting in constant innovation, little waste, and a rising standard of development.
  - COTS products adapt or become obsolete
  - Open market success brings competition and lower prices
  - Competitive market creates broader choice
  - Inferior products lose market share and die
  - Commercial developer is motivated to minimize cost and shorten development cycles

Exactly the rationale for pursuing COTS in the first place



# *Ongoing COTS Issues*



- Obsolescence
- Inconsistent and short term availability
- Fast turning commercial technology
- Constantly changing IC design and processes
- IC changes "react differently" in some DoD applications

# *Meeting COTS Challenges*

COTS challenges require a new mindset and new practices.

- COTS-Based System Tradeoffs
  - Leverage the Marketplace
  - Engineer an Evolvable Architecture
  - Avoid COTS Modification
- Think More Like a Business
  - Negotiate Licenses & Supplier Relationships
  - Realign Budgets for COTS Realities
- Establish Evolution as a Way of Life
  - Evolve COTS-Based Systems Continuously
  - Take the Long View on System Acquisition
  - Change the Culture

# *Lessons Learned*



- We see many benefits from using COTS
- We must adapt to COTS life cycle and design
- We Can Adapt
- Using COTS is good for Government and Industry
- Using COTS changes the way we build systems

# Conclusion

- Ample experience
- Right thing to do
- It is working

***There are no permanent victories  
to win is to stay alert and maneuver***